Stoller
Hanford Office

DOE-EM/GJ1005-2005

299-E26-71 (A6664)
Log Data Report

Borehole Information:

Borehole: 299-E26-71 (A6664)			**Site:** 216-A-24 Crib		
Coordinates (WA St Plane)		**GWL[1] (ft):** None		**GWL Date:** 08/15/05	
North (m)	**East (m)**	**Drill Date**	**Ground Level Elevation**	**Total Depth (ft)**	**Type**
136376.834	575689.527	08/83	652.03	43	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	2.65	6 5/8	6 1/8	1/4	2.65	43

Borehole Notes:

The logging engineer measured the casing diameter using a caliper and steel tape. Logging data acquisition is referenced to the top of casing.

Spectral Gamma Logging System (SGLS) Equipment Information:

Logging System:	Gamma 1E		**Type:**	SGLS (70%) SN: 34TP40587A
Effective Calibration Date:	04/12/05	**Calibration Reference:**	DOE-EM/GJ864-2005	
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0	

High Rate Logging System (HRLS) Equipment Information:

Logging System:	Gamma 1C		**Type:**	HRLS SN: 39-A314
Effective Calibration Date:	04/06/05	**Calibration Reference:**	DOE-EM/GJ865-2005	
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	**1**	**2**	**3**	**4 Repeat**	
Date	09/02/05	09/02/05	09/02/05	09/02/05	
Logging Engineer	Spatz	Spatz	Spatz	Spatz	
Start Depth (ft)	42.5	23.5	18.5	12.5	
Finish Depth (ft)	23.5	18.5	3.5	6.5	
Count Time (sec)	100	20	100	100	

Log Run	1	2	3	4 Repeat	
Live/Real	R	R	R	R	
Shield (Y/N)	N	N	N	N	
MSA Interval (ft)	1.0	1.0	1.0	1.0	
ft/min	N/A[2]	N/A	N/A	N/A	
Pre-Verification	AE106CAB	AE106CAB	AE106CAB	AE106CAB	
Start File	AE106000	AE106020	AE106026	AE106042	
Finish File	AE106019	AE106025	AE106041	AE106048	
Post-Verification	AE106CAA	AE106CAA	AE106CAA	AE106CAA	
Depth Return Error (in.)	N/A	N/A	0	0	
Comments	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment	

High Rate Logging System (HRLS) Log Run Information:

Log Run	5	6	7		
Date	09/02/05	09/02/05	09/02/05		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	24.5	42.5	35.5		
Finish Depth (ft)	18.5	38.5	30.5		
Count Time (sec)	300	300	300		
Live/Real	R	R	R		
Shield (Y/N)	N	N	N		
MSA Interval (ft)	1.0	1.0	1.0		
ft/min	N/A	N/A	N/A		
Pre-Verification	AC142CAB	AC142CAB	AC142CAB		
Start File	AC142000	AC142007	AC142012		
Finish File	AC142006	AC142011	AC142017		
Post-Verification	AC142CAA	AC142CAA	AC142CAA		
Depth Return Error (in.)	N/A	N/A	0		
Comments	No fine gain adjustment	No fine gain adjustment	No fine gain adjustment		

Logging Operation Notes:

Logging was conducted with a centralizer on each sonde. Measurements are referenced to the top of casing. A repeat section was collected in this borehole for the SGLS to evaluate the logging system's performance.

Analysis Notes:

Analyst:	Henwood	Date:	10/05/05	Reference:	GJO-HGLP 1.6.3, Rev. 0

Pre-run and post-run verifications for the logging systems were performed before and after data acquisition. Acceptance criteria were met for the SGLS. The HASQUARD limits were exceeded for the pre- and post-verification measurements for the HRLS. A decrease in the efficiency (net counts per second) suggests the ^{137}Cs concentrations were slightly underestimated. The HRLS is known to be performing poorly. However, there is no other logging system capable of collecting data in this activity range, and the borehole is scheduled for decommissioning in the near future. If the HRLS is taken out of service for repair, the opportunity to collect high rate data may be lost; therefore, the data are provisionally accepted.

A casing correction for 1/4-in.-thick casing was applied to the spectral log data (SGLS and HRLS).

SGLS and HRLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated with EXCEL

worksheet templates identified as G1EMar05.xls for the SGLS and G1CApr05.xls for the HRLS using efficiency functions and corrections for casing, water, and dead time as determined from annual calibrations. Dead time corrections are applied where dead times exceed approximately 11 percent for both the SGLS and HRLS. Because of the loss of efficiency of the HRLS detection system, SGLS data are considered more accurate until dead time is in excess of 70 percent. Where SGLS dead time exceeds 70 percent, HRLS data are substituted. No correction for water was necessary.

Log Plot Notes:

Separate log plots are provided for the man-made radionuclide (^{137}Cs) detected in the borehole, naturally occurring radionuclides (^{40}K, ^{238}U, ^{232}Th [KUT]), a combination of man-made, KUT, total gamma, and dead time, and total gamma plotted with dead time. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, casing corrections, or water corrections. Repeat log sections are also included where appropriate.

A comparison plot of the Westinghouse Hanford Company Radionuclide Logging System (RLS) data acquired in 1995 and the current SGLS data is provided.

Results and Interpretations:

^{137}Cs was detected in this borehole between the ground surface and the bottom of the borehole (42.5 ft). The maximum concentration was measured at approximately 217,000 pCi/g at 21.5 ft in depth.

The comparison plot of RLS data decayed to 2005 and the current SGLS data indicates no significant changes in the profile for ^{137}Cs since 1995 in most of the borehole. The RLS could not quantify concentrations in excess of approximately 3,000 pCi/g. Therefore, no comparison can be made in the highest activity depth intervals.

The repeat sections for the SGLS naturally occurring and man-made radionuclides indicate good agreement.

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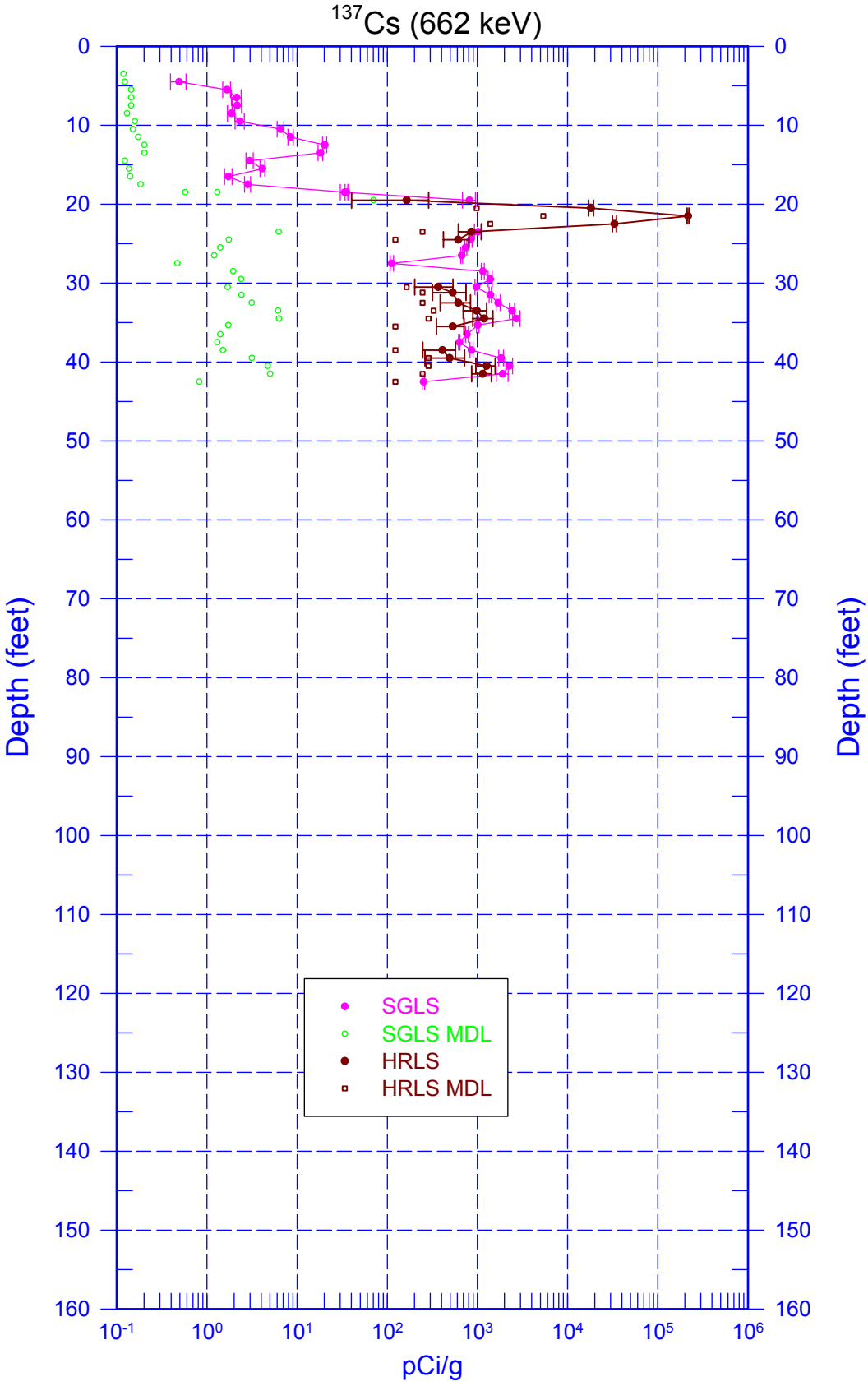
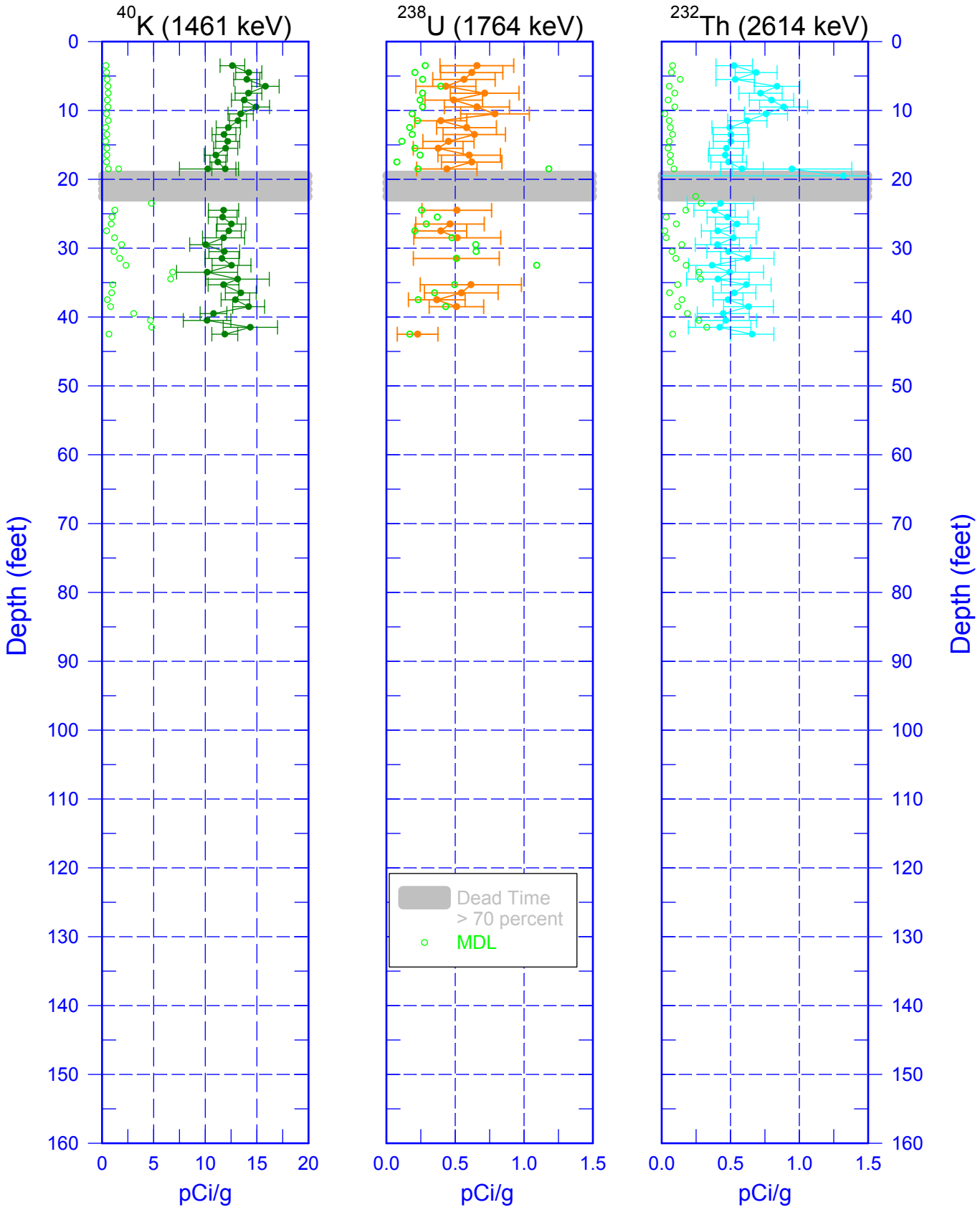
[1] GWL – groundwater level
2 N/A – not applicable

299-E26-71 (A6664)
Man-Made Radionuclides



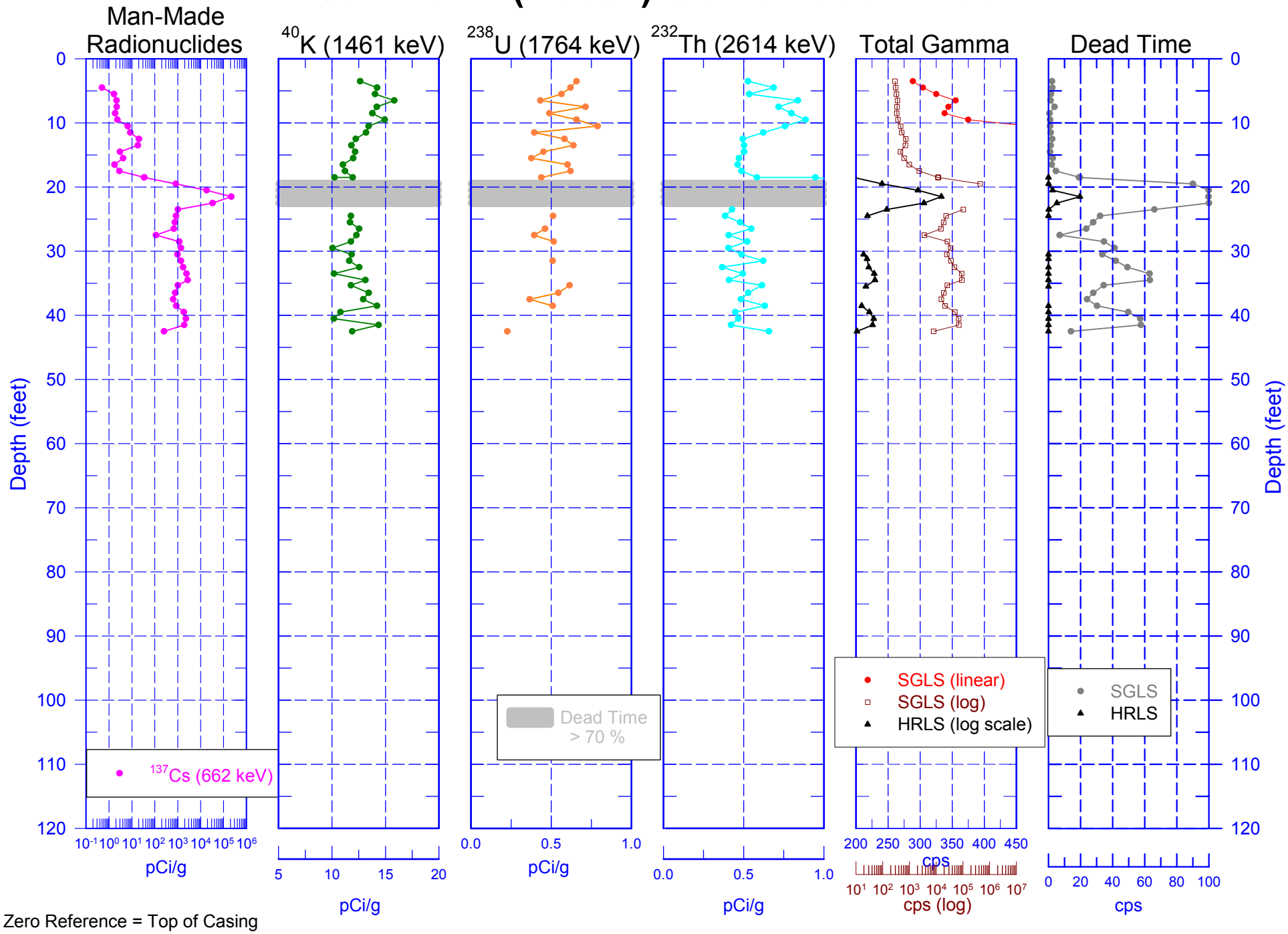
Zero Reference = Top of Casing

299-E26-71 (A6664)
Natural Gamma Logs



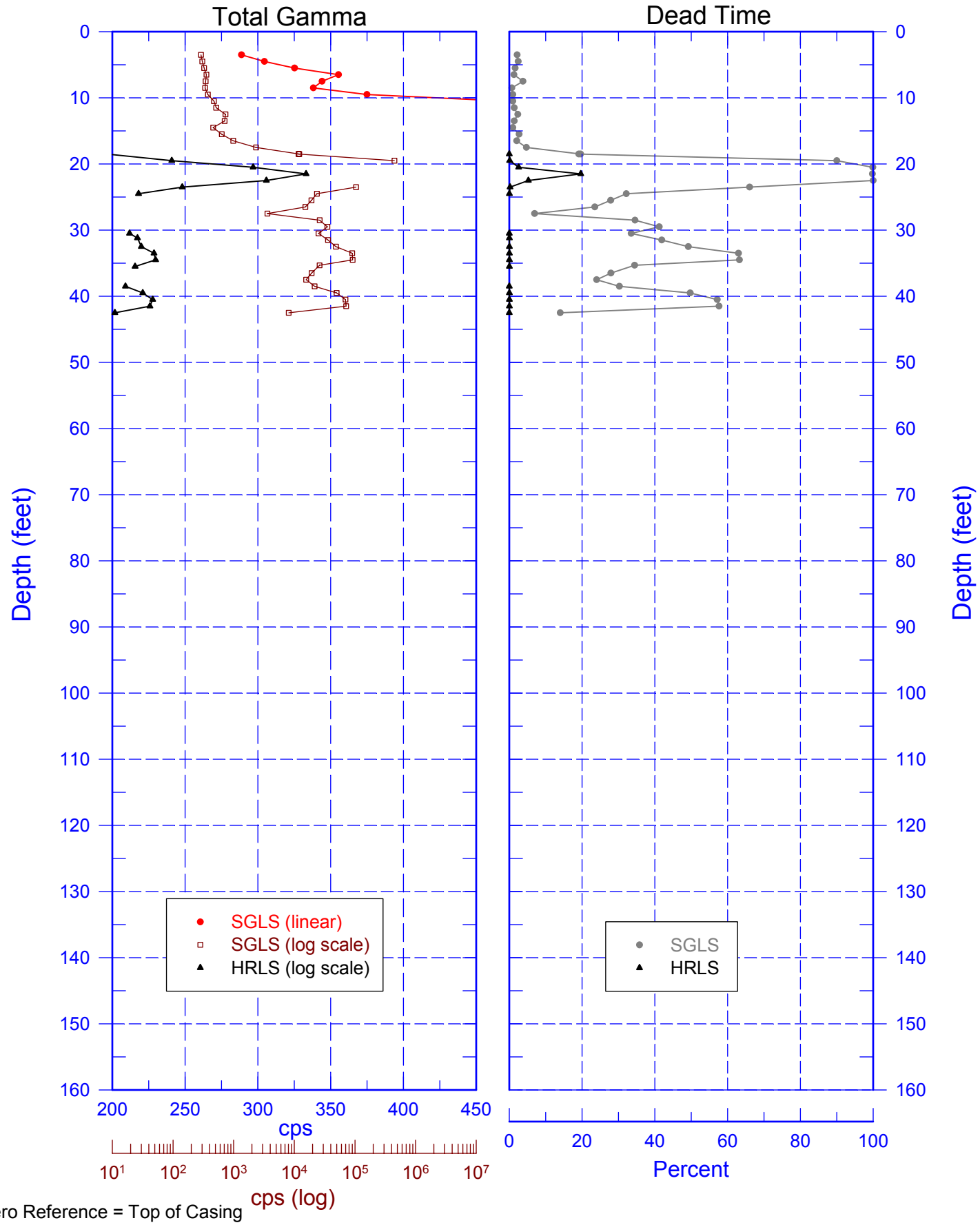
Zero Reference = Top of Casing

299-E26-71 (A6664) Combination Plot



Zero Reference = Top of Casing

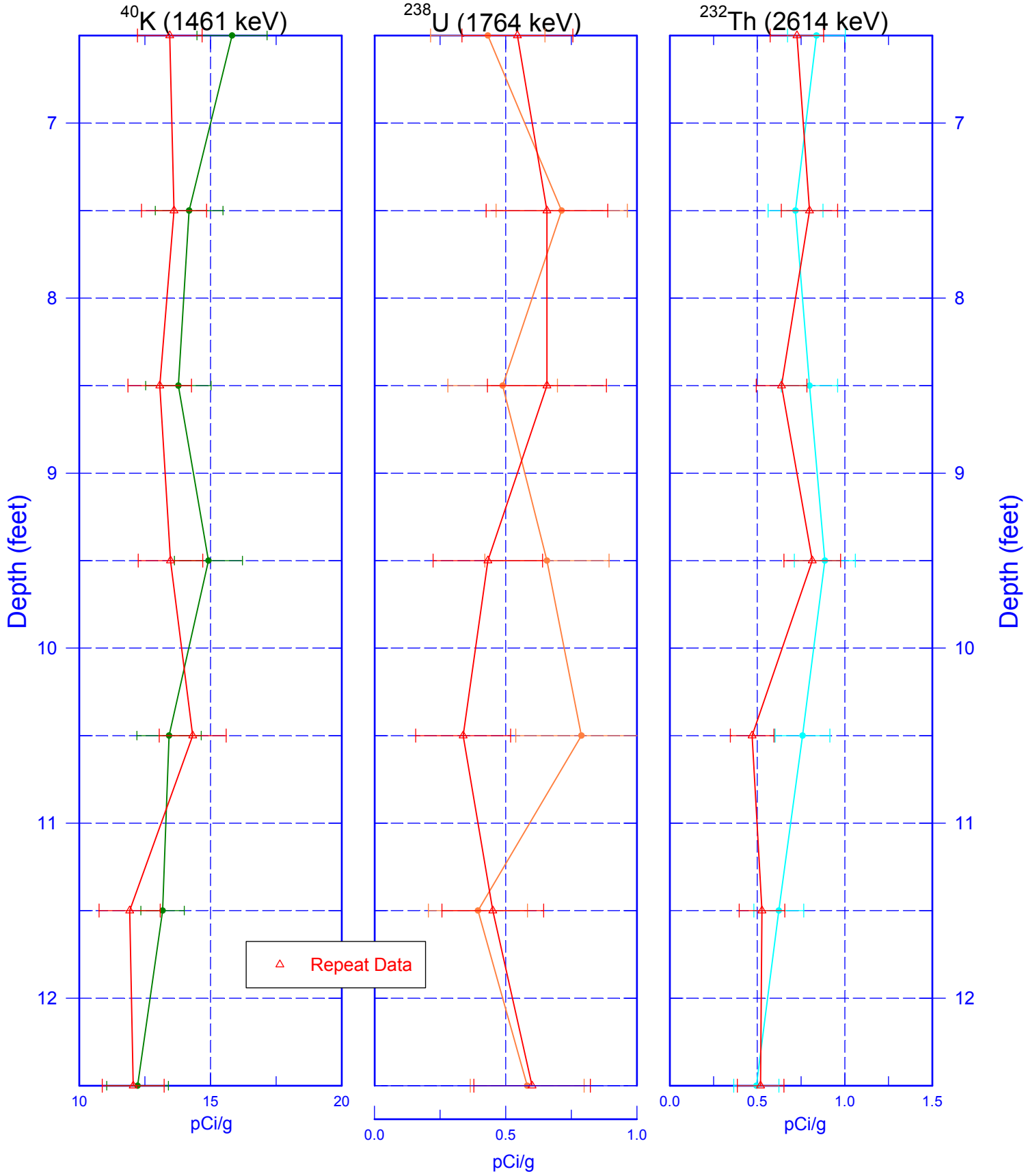
299-E26-71 (A6664)
Total Gamma & Dead Time



Zero Reference = Top of Casing

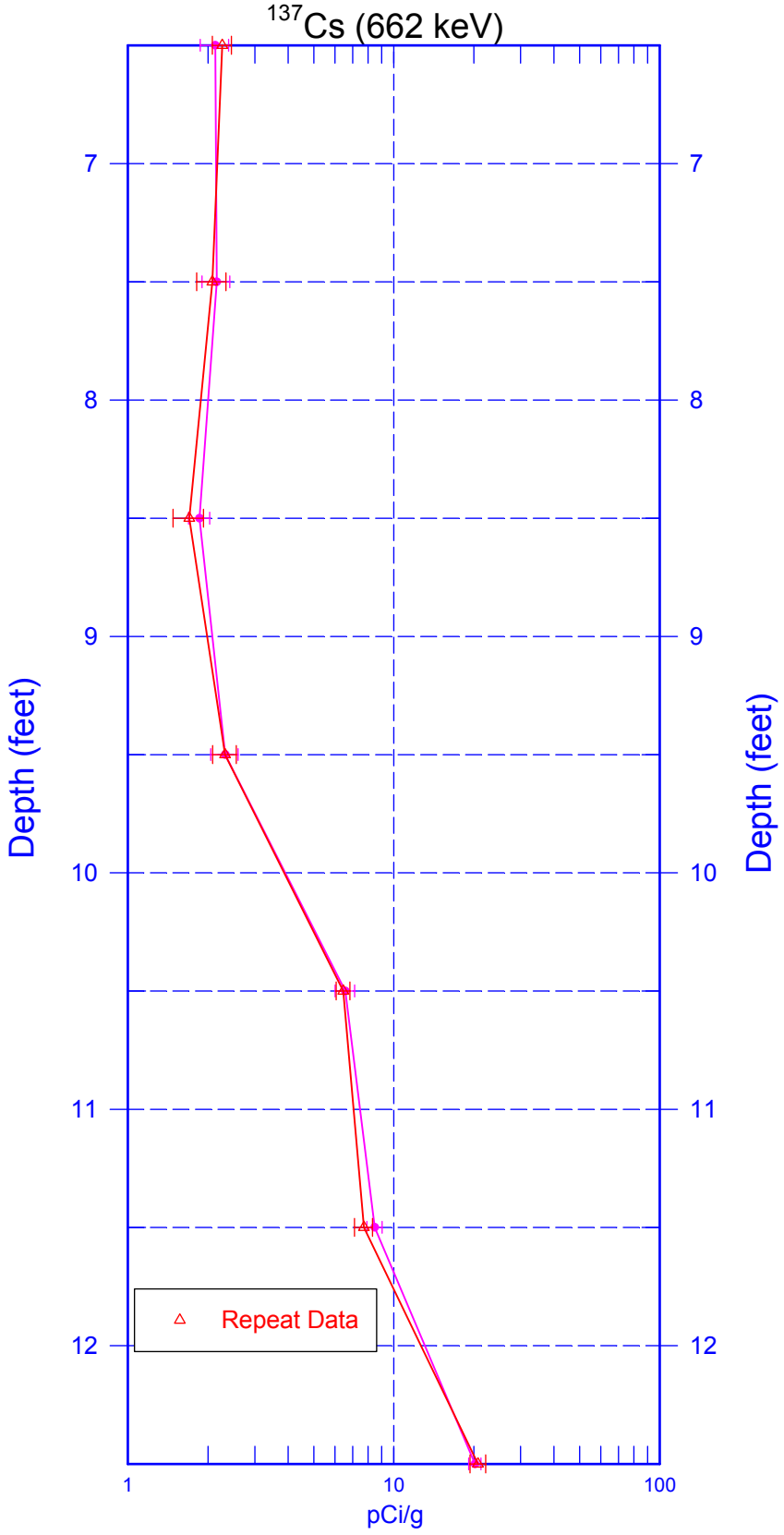
299-E26-71 (A6664)

Repeat Section of Natural Gamma Logs



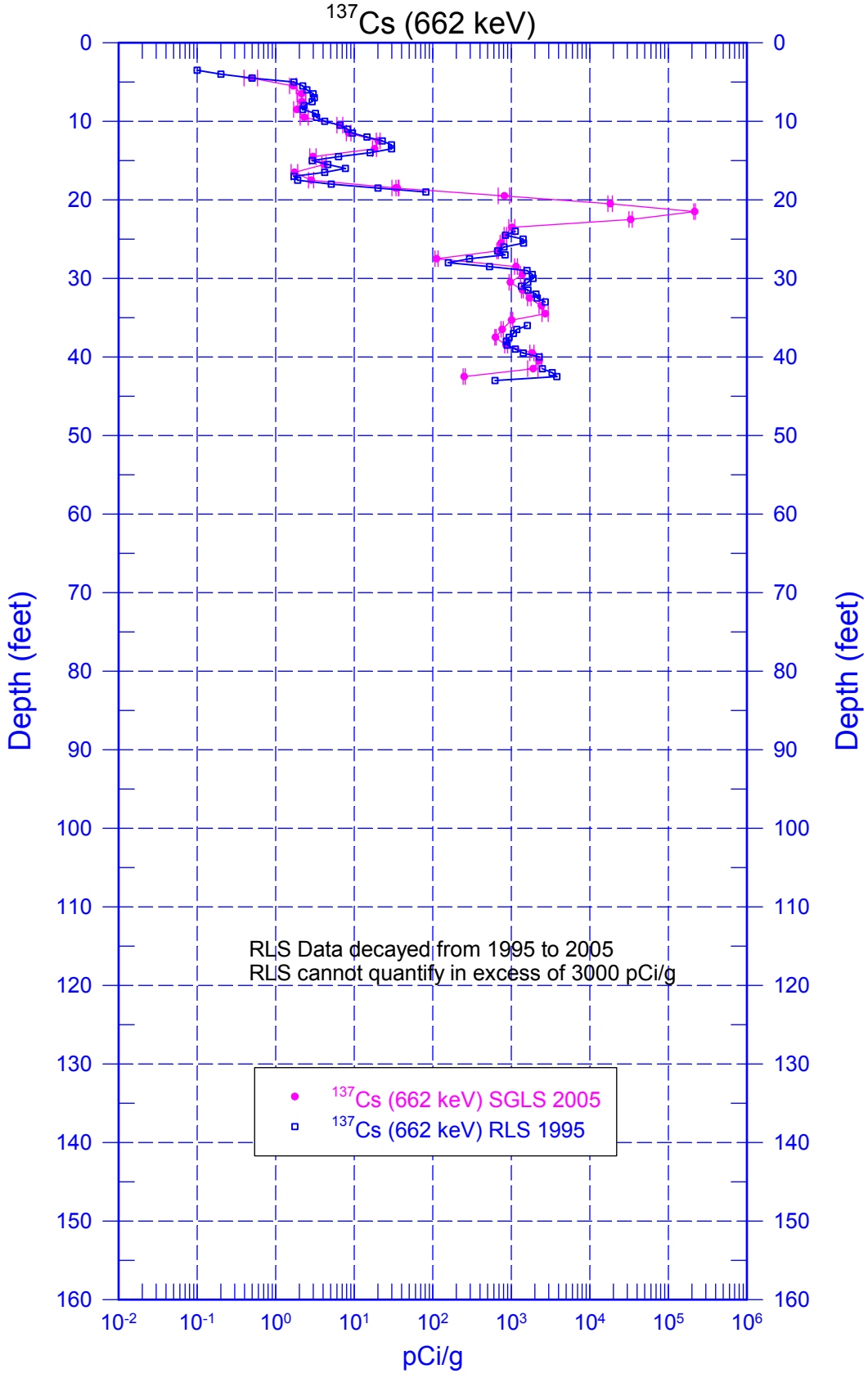
Zero Reference = Top of Casing

299-E26-71 (A6664)
Repeat Section of Man-Made Radionuclides



Zero Reference = Top of Casing

299-E26-71 (A6664)
SGLS & RLS Comparison Plot



Zero Reference = Top of Casing